The Deutschmark in Eastern Europe, Black Money and the Euro: On the Size of the Effect

Hans-Werner Sinn *
and Frank Westermann**

Since the announcement and the consummation of the marriage between the D-mark and the euro, the D-mark has lost a considerable part of its value, and during the same time, the share of D-mark currency in circulation in the total euro-11 monetary base (currency in circulation and banks' central bank deposits) has declined markedly (see Figures 1 and 2). In our opinion, these two facts are related, having to do with the D-mark stocks in Eastern Europe and Turkey and with the black money of the euro-11 countries. This paper discusses the magnitudes of the effects involved and their likely implications for the exchange value of the euro.[1]

According to Bundesbank estimates, one third of D-mark currency circulated outside Germany in 1995.[2] In today's circumstances this amounts to about €46 billion. Most of the D-marks were held in east and southeast Europe, where the countries freed from the Communist yoke were eager to exchange their own currencies against hard D-mark, and in Turkey in whose inflation-prone lira the "guest workers" had no confidence. Part of the money has returned to Germany in recent years as confidence in these countries' own currencies has grown and interest of the currency holders in the dying D-mark has waned. Many people did not know what to expect and many still do not know. Some have heard that the euro will replace the D-mark. But they do not know the exchange rate, do not know who will do the exchanging, and fear to be cheated by excessive commissions. To be sure, earlier currency conversions in their own countries always went hand in hand with considerable exchange losses. That is why they switch to the dollar, the Swiss franc or back into their own currencies, and that is one of the reasons why the D-mark and the euro are weak.

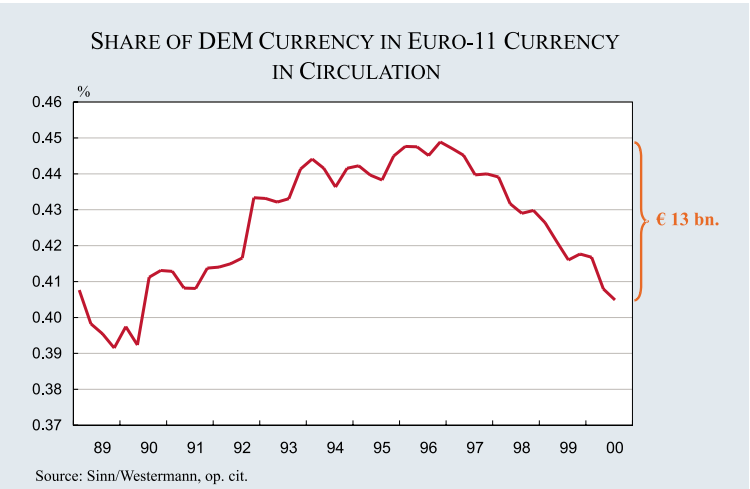
The returned D-mark stocks arrived back at the Bundesbank via the international banking system. The Bundesbank purchased these stocks because otherwise interest rates would have fallen. This explains the dramatic decline of the D-mark currency stock as a share of euro-11 money supply as shown in Figure 2.

This kind of passive intervention by the Bundesbank prevented part of the depreciation which might otherwise have occurred, but only part. By purchasing the returning D-mark stocks, German treasury bills flowed back to the private sector, distorting investors' international asset portfolios. Investors reacted by moving to foreign assets. This kept the exchange rate of the euro sufficiently low to make sure that the increase in German treasury bills was absorbed by international portfolios.

The decline of the euro did not require foreign currency holders to have moved directly into dollars. It was reinforced, however, to the extent to which the declining demand for D-mark was matched by an additional demand for dollars, for this put either direct or indirect additional downward pressure on the euro. Direct pressure is created when the Federal Reserve

* President, Ifo Institute for Economic Research.
** Center for Economic Studies at the University of Munich.
1 See Sinn and Westermann (2001) for a formal discussion of the problem.
2 Seitz (1995).

Figure 1



Source: Sinn/Westermann, op. cit.

does not increase the money supply despite the additional demand for dollars. Indirect pressure is created if the Fed does provide the additional dollars demanded in order to stabilise interest rates and sells them to the banks for treasury bills. The increasing scarcity of American treasury bills in investors' international portfolios results in a rising dollar and thus in a further depreciation of the euro.

The appreciation of the D-mark after the fall of the Iron Curtain, from 1989 to 1995, may be explained by a similar mechanism.[3] At the time, the German currency was sucked in by east European countries whose monetary systems inspired little confidence during the transition crisis. The Bundesbank, which kept wondering why the money supply exceeded the set target range, was forced to increase the money stock in order to keep interest rates from rising to exorbitant levels. The run on the D-mark was so strong that it created upward pressure on the D-mark which led to the breakdown of the EMS in late 1992 and a dramatic depreciation against the D-mark of most other currencies. This effect is not covered by Figure 2 which only shows the price of D-mark in terms of dollars.

Our theory predicts generally a positive correlation of the foreign exchange value of a currency and the amount of this currency in circulation if the central bank targets the interest rate rather than the money supply. We tested for this relationship and found the correlation to be highly significant and robust. The currency crisis of 1992 with the ensuing D-mark appreciation and the recent depreciation of the D-mark or the euro, respectively, can be explained with the same approach.

It is remarkable that the turnaround in the demand for D-mark occurred in 1996. This may be due to the fact that the announcement of the Dublin summit eliminated last doubts about the introduction of the euro and thus the demise of the D-mark. The abandonment of the D-mark started with the then emerging decisions and became stronger in later years when more and more market agents became aware of the political developments. The introduction of the euro on 1 January 1999 was only one link in a chain of events.

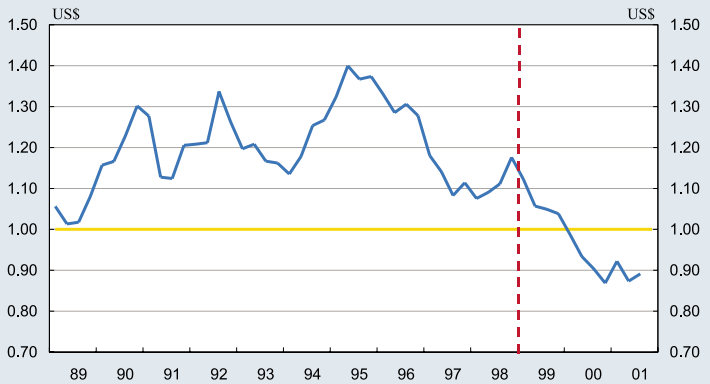
The uncertainty of foreign currency holders created by the demise of the D-mark is a fact supported by a great number of individual reports in the media and can no longer be denied. Unfortunately the Bundesbank does not have any exact statistics about the origin of the returning D-marks, but that the return flows are huge is an undeniable fact, and there is strong evidence that a considerable part originates in eastern Europe. The Ifo Institute published early on this.[4] At the beginning of 2001 the Ifo Institute also conducted a survey of 70 economic experts working in eastern Europe. A majority of the respondents reported about an increased uncertainty of the people in connection with the introduction of the euro and the modalities of the exchange as well as about a rising interest in other currencies. The Polish government warned its citizens against continuing to hold D-mark and recommended an exchange into sloty, but many people seem to be moving from the D-mark to other currencies than the sloty. Secret services report massive exchange transactions in Yugoslavia from the D-mark to the dollar.[5] Bundesbank President Welteke confirms the problem when carefully phrasing during a press conference on the topic:[6] "In all countries men-

3 An alternative explanation is the enormous demand for capital following reunification (Sinn 1999). According to the present state of knowledge, however, it was money demand rather than capital demand which caused the appreciation.

4 See articles by Hans-Werner Sinn in Handelsblatt (6 Nov. 2000), Financial Times (4 April 2001), and Süddeutsche Zeitung (6 April 2001).
5 Washington Post and International Herald Tribune (7 May 2001).
6 Minutes of the Bundesbank press conference on 25 June 2001.

Figure 2

DEM Exchange Rate in US$ Converted into Euro



Sources: Federal Reserve Bank of St. Louis, European Central Bank.

tioned (Poland, Russia, Turkey and the successor states of the former Yugoslavia) there exists a certain uncertainty, according to our knowledge, about what will happen to the stocks of D-mark when the euro notes and coins arrive on 1 January 2002".

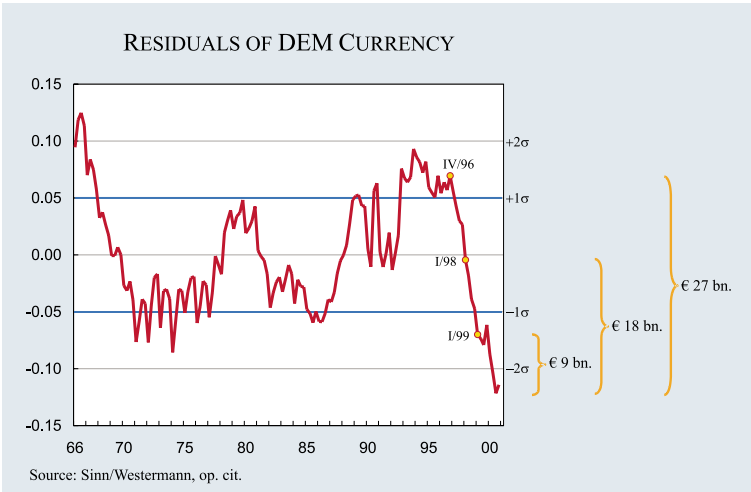
An extensive survey which the Austrian Central Bank has conducted over several years in Croatia, Hungary, Slovenia, the Czech Republic and Slovakia, confirms meanwhile that the decline of the share of D-mark in circulation in the total euro-11 money supply can be explained by the D-mark currency returning from abroad and that there was, in addition, a substitution of dollars for D-marks until the end of 2000. Surprisingly, the study revealed that as late as May 2001 no less than 41% of the holders of D-mark planned to exchange their stocks not into euro but into other currencies. The decline of the D-mark share in euro-11 money supply from 1997 to 2000, shown in Figure 2, corresponds to about €13 billion.[7] If this amount is deducted from the D-mark stock of €46 billion which, according to the Bundesbank, was held abroad, then at the beginning of 2001 about €33 billion of D-mark should have existed in eastern Europe. 41% of this sum amounts to about €14 billion. This is the size of the D-mark currency stock which, according to the findings of the Austrian Central Bank and our own calculations, can be expected to be exchanged for dollars in the period from May 2001 to February 2002, when the physical conversion will be completed.[8]

The abandonment of the D-mark by the east Europeans and Turks is not the only reason for the euro weakness, however. Firstly, in eastern Europe other European currencies are also held like the schilling, the lira or the finmark. Secondly, there are considerable stocks of black money, which may amount to at least another €50 billion for the euro-11 countries.[9] The flight out of black money also contributes to euro weakness. Those who hold black money will hardly go to the bank teller in January and February 2002, show their identity card and answer the questions of the bank officer who is obliged to ask them because of money laundering laws. They must get rid of the money before then, and exchanging it directly for Swiss francs, British pounds or US dollars is best. In contrast to the eastern-Europe effect this effect will concern all European currencies and therefore does not show up in a shift of the share of D-mark notes and coins in the total euro-11 money stock.

Unfortunately we lack the data for directly estimating the joint eastern-Europe and black-money effect on all euro-11 countries. What we can estimate is the sum of the eastern-Europe effect and the black-money effect on the D-mark. Toward this end we estimated German money demand for the period 1966 to 2000 with the usual variables, i.e. money market interest rate, gross national product, and time and determined the residuals, i.e. the deviations from trend. The result is shown in Figure 3. The residuals seem to follow about the same pattern as in Figure 2 and fall below the two-sigma range which can

7 In order of magnitude, this number corresponds to the findings by Stix (2001). His Table 1 shows that in the countries under consideration the share of D-mark currency circulating there in total German money supply declined from 2.01% to 1.69% from 1997 to 1999, corresponding to a decline of D-mark currency abroad of 16% in two years or about 23% in three years. Taking this figure which was determined on the basis of a limited number of east European countries and relating it to the total D-mark stock outside Germany of €46 billion (Seitz 1995), yields an absolute decline of D-mark currency stock of around €11 billion in the years 1997 to 2000. The insignificant difference of €2 billion may be due to the countries surveyed by Stix not being completely representative of total D-mark stocks held abroad.

Figure 3



Source: Sinn/Westermann, op. cit.

8 From June 2000 to June 2001 the stock of circulating D-marks declined by €9 billion in absolute terms, and from January to June 2001, it declined by nearly €5 billion. The corresponding deviations from the growth trend which matter more are even larger.

9 Schneider and Ernste (2000).

be considered – with 95% confidence – as an anomalous development.[10]

The sharp decline of the money supply from the first quarter 1997 to the last quarter of 2000 corresponded to an absolute decrease of the D-mark money demand against the trend in the amount of €27 billion. This is probably the joint effect of exchanged black money and returning currency from eastern Europe and Turkey.

Extrapolating this amount to all euro-11 countries is difficult because the eastern-Europe effect is unlikely to be distributed evenly among all currencies. The D-mark accounted for a share of 41% in total euro-11 money supply, as shown in Figure 1. If the eastern-Europe effect and the black-money effect were distributed evenly, the total effect on the euro-11 countries' currency in circulation would be a decline of €67 billion. This figure is certainly too high. A lower figure results if the change in proportions, which is shown in Figure 2 and which corresponds to an absolute amount of €13 billion, is interpreted as the return flow of D-marks from eastern Europe and if we further assume that this return flow is limited to the German currency. Assuming again a symmetrical black-money effect in all other euro-11 countries yields a total effect in the amount of €48 billion for the part of the euro-11 money supply which could have returned from eastern Europe, Turkey and black money coffers to the central banks of the euro-11 countries in the four years from 1997 to 2000.

This amount is only a rough and indirect estimate.[11] After all, part of the decline may have been due to the introduction of electronic payment transactions. Furthermore, the share of notes and coins which may be considered black money could have been higher in the other euro-11 countries than in Germany.[12] And finally, the total does not include, as mentioned, the other euro currencies which are also returning from eastern Europe. Nevertheless, as the German decline in money balances against the trend is €27 billion, a euro-11-total of about €50 billion does not seem implausible.

Some have argued that the effect described by us, while being theoretically possible, is much too small to be able to explain a noticeable part of the actual exchange-rate movements. After all, they claim, that part of the money supply which is involved is very small relative to the size of international capital flows and also relative to the total stock of international assets. Indeed, €48 billion are only 14% of the euro-11 monetary base, only 2.4% of M1 (currency in circulation plus demand deposits), only 0.9% of M3 (currency in circulation, demand deposits, time and savings deposits) and an even smaller (by the tenth power) percentage of the total portfolio of assets including bonds, shares, property, works of art, etc., not to mention foreign exchange flows. The fact is clear, but nothing can be deduced from its observation alone. There are a number of reasons why the arguments put forth are without substance and why a change in money demand in the magnitude mentioned suffices to explain a substantial part of the exchange rate movements.

1) Stocks and Flows

A comparison of money stocks with trade flows in foreign exchange markets makes no sense as it compares apples with pears. Behind the €48 billion stands a multiple of annual transactions, as each individual coin and banknote changes hands several times. In Germany GDP amounts to DM 3,972 billion and – after deducting the D-marks held abroad according to Bundesbank estimates – currency in circulation amounts to about DM 180 billion. This corresponds to a velocity of 22. Applied to the figure mentioned, this yields a change in the volume of transactions achieved abroad with the help of the D-mark in the amount of at least DM 1,056 bil-

10 In a multiple regression it is of course always possible to improve the fit of the cyclical movement by including additional variables like lagged values of the interest rate, GDP and exchange rate and thereby lower the residuals. From an economic point of view this would be a nonsensical procedure which would cloud the special features of the past development rather than highlight them. Time, the present interest rate and the present GDP are the variables which – according to economic theory – explain the demand for money, and perhaps also the present stocks of assets. Past values of these variables do not belong in the equation. For comparison, we did apply such a dynamic specification in the sense of a error correction model (Sinn and Westermann 2001). A comparison of the accumulated residuals did not yield qualitatively different results from the above. (Frequently the mistake is made in interpreting dynamic models to look at the simple instead of the accumulated residuals.)

11 We lack the data necessary for a more direct estimation. A preliminary analysis of the situation in France, Italy and Spain confirms the reduction in the currency in circulation relative to the trend which we found in Germany. In France which experienced a short-run reduction in the velocity of money circulation during the year 2000, the monetary base has fallen sharply in recent months. In June 2001 its absolute value was again as low as in 1997 although the economy had grown considerably in the meantime.

12 At least this follows from the analysis of Schneider and Ernste (2000).

lion. Even this figure is too low because the true transactions volume behind GDP (gross production, which is unfortunately not measured for the aggregate economy) is still bigger. Since nobody knows the true velocity of money for different uses, trying to explain exchange rates with transaction flows makes no sense at all. Macro theory learned this half a century ago when it abandoned the Loanable Funds theory and trade theory learned it a quarter century ago from the Asset Approach.

2) Only Money Matters

In contrast to other models of this kind, the portfolio-balance model formulated by us differentiates between currency, bonds and shares in the international wealth portfolio.[13] It shows that the exchange rate depends only on the stock demand for money in the narrow sense, i.e. M1 or M0, and not M3 or other aggregates of interest-bearing assets. The demand for bonds or shares cannot affect the exchange rate directly but at most indirectly via the demand for money in the narrower sense of the word. By itself the demand for such assets is irrelevant, however big it might be. It explains asset prices and interest rates, but not exchange rates. In short: "Money matters!" even if stocks are small. The mere remark that money stocks are small is an irrelevant statement of fact, but certainly no counter argument.

That only money in the form of M1 can play a direct role is, by the way, not so much an implication of a specific model specification, but almost an implication of sheer logic. The exchange rate is not the rate of exchange between any two profitable assets, but between the currencies of different countries. For some unknown reason, this seemingly trivial fact is frequently overlooked.

In this connection it should be emphasised that only M1 is concerned here and not the "money supply" M3 which is the focus of the European Central Bank. Since M3 also includes time and savings deposits which themselves are close substitutes for treasury bills which the Central Bank uses in its open-market operations, it hides much of the relevant effects resulting from the return of the eastern-Europe currencies or the fleeing black money.[14]

In order to keep interest rates constant, the European Central Bank is forced to absorb part of the returning currencies by selling treasury bills. Vice versa, the central banks of other countries are forced to sell part of the demanded currencies for treasury bills and similar assets in order to prevent the demand from raising interest rates. When the exchange is completed, fewer foreign treasury bills and more European treasury bills will be in the hands of the public which, in order to re-establish international portfolio balance, requires a lower exchange value of the euro. After such an action, fewer time and savings deposits and more currency will be available outside Europe whereas in Europe it will be just the reverse, but the "money stock" M3 has neither changed here nor there.

3) Central Bank Intervention would also be Negligible

If the mentioned money stocks were really too small to have noticeable exchange-rate effects, this would have consequences not only for our explanation. Any attempts of the European Central Bank to support the exchange rate by interventions would also be in vain. Although the ECB does not make public the volume of exchange-market intervention, inofficially mention is always made of only few billions of euro. If such intervention amounts are to be effective, then a return flow of some €50 billion, as identified by us, will also be effective.

Indeed, an intervention in the foreign exchange market at constant short-term interest rates, i.e. sterilised by an adjustment of the money supply, works via the same mechanism as the returning eastern-European and black money. It changes

13 The portfolio approach permits only interest-bearing assets in the broader sense, and the monetary approach ignores that interest-bearing assets of different countries cannot be perfect substitutes if only because of the exchange-rate risk. We know of no other approach which combines the assumption of imperfect substitutability and the assumption that international investors hold different currencies. Both assumptions are necessary, however, in order to understand the complex effects of a change in the money demand, the reactions of a central bank pursuing an interest-rate target, and the exchange rate.

14 When the Bundesbank decided to change from M1 to M3 as the money aggregate to be targeted because M1 was too volatile, it might implicitly have reacted to the shift in the components of M3 caused by the Turkish and eastern European money demand. Because of the unknown development of the foreign money demand, money-supply targeting became inappropriate and was replaced in fact by interest-rate targeting.

the ratio of non-European and European treasury bills in the international asset portfolio and demands an exchange-rate adjustment in order to re-establish portfolio balance in the financial market. Despite sterilisation, exchange-market intervention does have exchange-rate effects.

4) Three Quarters Can be Explained

The important question is, however, whether a decline of the monetary base by about €50 billion can indeed cause effects large enough to be of practical relevance. Answering this question requires an empirical determination of the corresponding reaction coefficients. Recent contributions by Evans and Lyons (1999 and 2001) on the "micro structure of the exchange rate" conclude, on the basis of extensive empirical analyses, that each billion of additional sterilised dollar money demand raises the dollar exchange rate by one half cent. If about the same figure applies to the euro, then this means that our theory explains the depreciation of the euro by about 25 cents in the period 1979 to 2000. This is about three quarters of the actual depreciation which was 34 cents during this period.

The downward pressure on the euro will most likely continue in 2001, although speculative changes in expectations due to the attack on the World Trade Center may help the euro. The physical introduction of the euro in January and February of next year will eliminate the downward pressure. The euro will gradually become popular in eastern Europe and it will probably also find its way back to the black markets. The fall of the Iron Curtain bolstered the D-mark in the early 1990s, fear of its conversion into the euro has weakened it after 1997 and with it the euro itself. According to the same logic, a period of strength could begin for the euro once the conversion has occurred.

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